



AMP2A-VTR and AMP2A-VTR2

2U Stereo Audio Speaker Monitors

with Four Inputs (AMP2A-VTR) or Two Banks
of Four Inputs (AMP2A-VTR2) on Phoenix,
Summable Independent Left/Right Speaker Channel
Assignment, Selected Stereo Output on Two XLR, Four
53-Segment LED Level Meters, and Phase Indication

Document P/N **821580** REV-B

User Manual

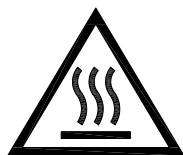
CONTENTS

<u>Title and Contents</u>	1
Important Safety Instructions and Introduction	2
<u>Section 1: Features, Specs, and Installation</u>	3
Description and Features	4
Applications and Specifications	5
Installation	6
<u>Section 2: Operation</u>	7
Front Panel Features	8
Rear Panel Features	12
Audio Amplifier and Speaker Configuration	14
<u>Section 3: Technical Information</u>	15
General Technical Observations	16
Level Meter Rear Panel 6-Position DIP Switch Settings	17
Level Meter Internal 10-Position DIP Switch Settings	18
Level Meter DIP Switch Locations	19
Level Meter Alternative Scales	20
Level Meter Phase Correlation Feature	20
AMP2-VTR Interconnect Block Diagram	21
AMP2-VTR2 Interconnect Block Diagram	22

Important Safety Instructions

- 1) Read these instructions.
- 2) Keep these instructions.
- 3) Heed all warnings.
- 4) Follow all instructions.
- 5) Do not use this apparatus near water.
- 6) Clean only with dry cloth.
- 7) Do not block any ventilation openings. Install in accordance with the manufacturer's instructions.
- 8) Do not install near any heat source such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.
- 9) Do not defeat the safety purpose of the polarized or grounding-type plug. A polarized plug has two blades with one wider than the other. A grounding type plug has two blades and a third grounding prong. The wide blade or the third prong are provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.
- 10) Protect the power cord from being walked on or pinched, particularly at plugs convenience receptacles and the point where they exit from the apparatus.
- 11) Only use attachments/accessories specified by the manufacturer.
- 12) Use only with the cart stand, tripod, bracket, or table specified by the manufacturer, or sold with the apparatus. When a cart is used, use caution when moving the cart/apparatus combination to avoid injury from tip-over.
- 13) Unplug this apparatus during lightning storms or when unused for long periods of time.
- 14) Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as when power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.
- 15) Do not expose this apparatus to rain or moisture.
- 16) The apparatus shall be connected to a mains socket outlet with a protective earthing connection.

CAUTION!



In products featuring an audio amplifier and speakers, the surface at the side of the unit, where the audio amplifier heat sink is internally attached, may get very hot after extended operation. When operating the unit exercise caution when touching this surface and ensure that external materials which may be adversely affected by heat are not in contact with it. There is a Hot Surface label (see diagram) attached to the aforementioned surface of the product.

Introduction

Congratulations on your selection of a Wohler Technologies product. We are confident it represents the best performance and value available, and we guarantee your satisfaction with it.

If you have questions or comments you may contact us at:

Wohler Technologies, Inc.

31055 Huntwood Avenue

Hayward, CA 94544

Phone: (510) 870-0810 Fax: (510) 870-0811

US Toll-Free: 1-888-596-4537

www.wohler.com **support@wohler.com**

Section 1

General Features and Specifications

Description

Features

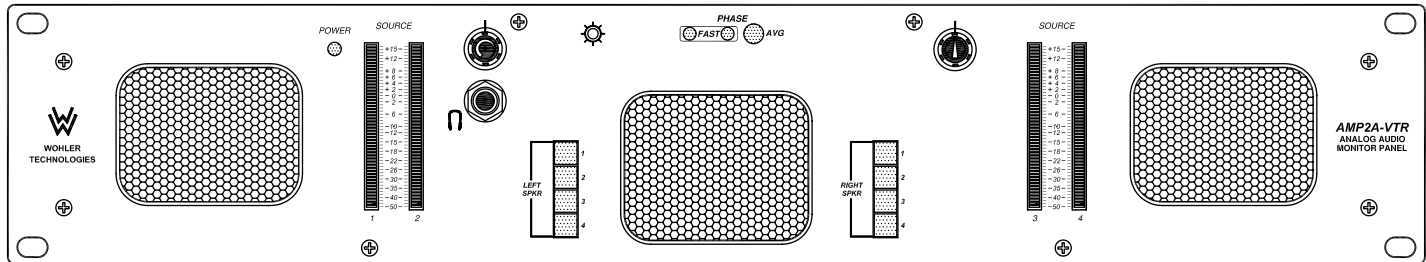
Applications

Specifications

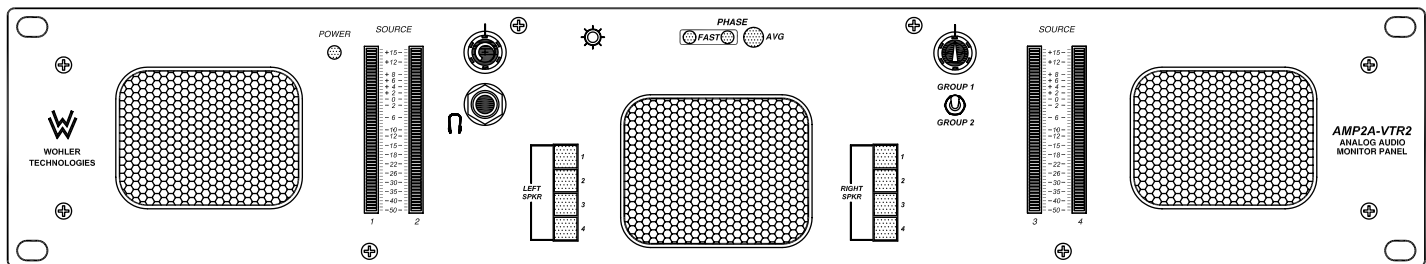
Installation



AMP2A-VTR and AMP2A-VTR2 2U Stereo Audio Speaker Monitors



AMP2A-VTR Front Panel



AMP2A-VTR2 Front Panel

Description

The **AMP2A-VTR** and **AMP2A-VTR2** are audio monitors capable of audibly monitoring up to four Analog source channels through an internal stereo speaker system while simultaneously visually monitoring all four channels of the selected source via four high-resolution 53-segment LED bargraph level meters. Two banks of four buttons on the front panel are used to independently assign from one to four (summed) channels to each of the two (left and right) speaker channels. Features for these two models include a ganged stereo volume control and balance pot, power indication LED, headphone output, and a stereo analog output on two balanced XLR connectors of the channels assigned to the left and right speaker channels. Output limiter circuits are incorporated to protect the speakers, and extensive magnetic shielding allows placement immediately adjacent to video monitors with no color impurities. Wohler Technologies proprietary three-LED stereo phase indication feature allows monitoring of phase relationships of the selected channels assigned to the left and right speaker channels. The four 53-segment LED bargraph level meters offer selectable Input Reference Level, Display Mode, Peak Hold, Ballistics, Phase Correlation, and alternate scales.

The **AMP2A-VTR** rear panel features Analog inputs on four balanced Phoenix connectors. The **AMP2A-VTR2** rear panel features two banks of four Analog inputs (eight total) on balanced Phoenix connectors and a front panel toggle switch for choosing between the two banks of four inputs.

All **AMP2 Series** units contain three audiophile-quality drivers and three power amplifiers; two amplifiers (and two speakers) that reproduce midrange and high frequency information in stereo, and a third amp/driver combination (and speaker) that handles summed Low Frequency (LF) information below the 500 Hz crossover point. The **AMP2 Series** unique audio design has two important advantages. First, it provides optimally focused sound in an Ultra Near Field™ (1 to 3 feet) environment. This allows higher SPL for the operator while reducing overall ambient sound and adjacent bay crosstalk. Second, electronic rather than acoustic cancellation of bass frequencies provides positive audible detection of reversed polarity (out of phase) audio feeds.

Features

- 104 dB SPL at two feet
- Only two rack spaces high
- Excellent high frequency response for positive detection of background whine and noise
- Audible and visual indication of phase/polarity problems
- Thorough magnetic shielding for placement next to video monitors
- Four 53-segment high-resolution tri-color bargraph level meters:
 - Selectable Input Reference Level (0, +4, +6, or +8 dBu)
 - Selectable Display Mode (VU Only, VU/PPM, or PPM Only)
 - Selectable Peak Hold (Manual, 3-Second, 10-Second, or Off)
 - Selectable Ballistics (Type I, Type II, DIN 45406, or SSRT)
 - Selectable alternate Bargraph Scales (AES, Extended VU, Alternative AES, VU, BBC, NORDIC, and DIN)
 - Selectable Phase Correlation feature
- Two banks of four push buttons for assigning single or summed channels to the left and right speakers
- Digital/analog source selection via front panel toggle switch
- Headphone output
- Power indication LED
- AMP2A-VTR: Analog audio inputs on four balanced Phoenix connectors
- AMP2A-VTR2: Analog audio inputs on two banks of four balanced Phoenix connectors with front panel toggle switch
- Analog outputs of source selected for speaker monitoring on two balanced XLR connectors
- Numerous control and input options
- Quick and easy installation: simply slide in the rack and connect audio and AC power

Applications

The AMP2A-VTR and AMP2A-VTR2 are ideally suited for use in VTR bays, mobile production vehicles, teleconferencing installations, multimedia systems, satellite links and cable TV facilities, and on-air radio studios. Designed and manufactured in the U.S., both models are backed by a strong warranty and a satisfaction guaranteed return policy.

General Specifications

Analog Input Connectors:	Phoenix Terminal Block (3-pin, male)
Analog Input Impedance:	90K Ω , balanced
Peak Acoustic Out (@ 2 ft.):	104 dB SPL
Power Output, RMS Each Side (4Ω): RMS Bass (4Ω):	14 W transient / 10 W continuous 35 W transient / 25 W continuous
Frequency Response, Sixth Octave:	80 Hz - 16 kHz \pm 5 dB (-10 dB @ 40 Hz, 20 kHz)
Input Level for Maximum Output (Volume Full On):	0 dBv balanced / -10 dB unbalanced
Hum and Noise (analog):	Better than -68 dB below full output
Distortion, Electrical:	Less than 0.15% at any level below input threshold
Distortion, Acoustic:	6% or less at worst case frequencies above 120 Hz, including cabinet resonance; typically less than 1.5%
Input Overload:	+26 dBv balanced
Analog Out S/N:	>90 dB
Analog Out THD:	<0.008%
Magnetic Shielding:	<0.8 Gauss any adjacent surface
Power Consumption (Average Maximum):	45 W
AC Mains Input:	100-240VAC, 50-60 Hz Universal

Level Meter Specifications

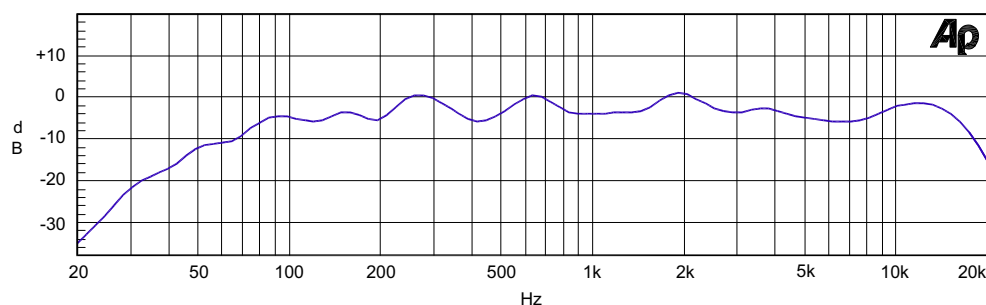
Level Meter Type:	53-Segment tri-color (R,A,G) LED
Display Modes (select):	VU, PPM, or VU/PPM
Peak Hold (select):	Manual, 3-sec, 10-sec, or OFF
PPM Ballistics (select):	Type 1, Type 2, DIN 45406, or SSRT
Reference Levels:	0, +4, +6, +8 dBu (DIP selectable)
Phase Correlation:	ON or OFF
Bargraph Scales:	VU, Ext. VU, BBC, NORDIC, or DIN
Dynamic Range:	65 dB
Midscale Resolution:	1 dB
Segment Colors:	Tricolor (green, amber, red)
Scale:	+15 to -50 dB
Segment Size:	.158" x .04" (4.0132 x 1.016 mm)

Physical Specifications

Weight:	18 lbs. (8.2 kg)
Dimensions (HxWxD):	3.5 x 19 x 12 inches (89 x 483 x 305 mm)

Many custom options are possible. Call your dealer or Wohler Technologies to discuss your specific needs.

Audio Response Curve



Typical 1/6 Octave Audio Response Curve

Units are designed to meet, at time of manufacture, all currently applicable product safety and EMC requirements, such as those of CE. 0 dBv ref. 0.775V RMS. Features and specifications subject to improvement without notice.

Installation

Mounting

The unit should be mounted where convenient for operating persons, ideally at approximately ear level for best high frequency response and eye level for best visual observation of the level meters. Its superior magnetic shielding eliminates concerns about locating it adjacent to most types of CRT monitors, including high-resolution color monitors.

Heat Dissipation

Heat dissipated by the speaker amps is conducted directly to the left side of the chassis; no special considerations for cooling are necessary as long as the ambient temperature inside the rack area does not exceed approximately 40°C (104°F).

Sympathetic Vibration

Sympathetic vibration from other equipment (cables, etc.,) in the rack may be serious enough to interfere with the unit's sound quality out in the listening area. The use of thin card stock and/or felt or foam weather-stripping type materials between adjacent vibrating surfaces, or tying up loose cables, etc., may be required to stop vibrations external to the unit.

Mechanical Bracing

Even though the unit is fairly heavy, the chassis is securely attached to the front panel at eight points along its surface, not just at the four corners of the chassis ears. This feature will reduce or eliminate rear bracing requirements in many mobile/portable applications. The weight of internal components is distributed fairly evenly around the unit.

Audio Connections

Connection of the audio feeds is straightforward. Please refer to the system interconnect block diagrams on pages 21 and 22 for clarification of the general signal paths into and out of the AMP2A-VTR and AMP2A-VTR2 units.

Electrical Interference

Care should be exercised to avoid mismatched cable types and other similar causes of undesired reflections in RF signal systems. If severe enough, such reflections can result in undesirable electrical interference in the audio signals.

AC Power

The unit's AC mains connection is via a standard IEC inlet, with safety ground connected directly to the unit's chassis. The universal AC input (100-240VAC, 50/60Hz) switching power supply is a self-resetting sealed type, with automatic over-voltage and over-current shutdown. There is no user-replaceable fuse in either the primary or secondary circuit.

Section 2

Operation

Front Panel Features

Rear Panel Features

Audio Amplifier and Speaker Configuration

Front Panel Features

Please refer to **Figure-2a** on the following page to familiarize yourself with the front panel features of the AMP2A-VTR and AMP2A-VTR2 units. The following sections describe these features and are referenced, by number, to **Figure-2a**.

1 Speakers

All **AMP2 Series** models feature two mid-range speakers (left and right) and *one* woofer speaker. Two amplifier/driver combinations handle midrange and high frequency information in the left and right (stereo) speaker channels, while the third channel reproduces and sums the left and right channel information *below* the 500 Hz crossover point in the woofer (bass) speaker(s). Note that the woofer channel is NOT a dedicated **LFE** (subwoofer) or **Center** channel. See page 14 for more information concerning the **AMP2 Series** audio amplifier/speaker configuration.

2 Power LED

This LED glows GREEN to indicate the unit is connected to mains power and an operation voltage is present.

3 Audio Level Meter LED Bargraph Displays (1-4)

These four tri-color LED bargraph level meters display audio levels for the four audio signals entering the AMP2A-VTR unit or, in the case of the AMP2A-VTR2 unit, the four channels selected by the **Group Select Switch** (Item 10, page 10). All bargraph LED segments are of the tri-color type (green, amber, red) and are user adjustable for **Reference Level**, **Display Mode**, **Peak Hold**, **PPM Ballistics**, **Alternate Bargraph Scales**, and **Phase Correlation** via DIP switches on the rear panel and inside the unit. For factory set and user adjustable level meter DIP switch settings, see pages 17 and 18. For more information about the **Phase Correlation** feature, see page 20. For meter specifications, see page 5.

4 Volume Control Pot

This controls the loudness of the audio reproduced by the internal speakers or connected headphone. Clock-wise rotation of this control increases the loudness of the monitored audio in both speaker channels.

5 Headphone Jack

This jack accepts a standard 1/4" phone type stereo plug. When you plug in headphones, the speakers will mute.

6 Speaker Assign Channel Buttons (Left and Right)

Use the *left* bank of four buttons to assign one to four of the four available channels for monitoring from the *left* speaker channel. Use the *right* bank of four buttons to assign one to four of the four available channels for monitoring from the *right* speaker channel. Channel buttons toggle On/Off and will light up BLUE to indicate they are selected.

Operation for channel selection for each bank of four buttons is as follows:

Single Channel Select: Press and *release* a single channel button to select that channel (and *deselect* any previous selection). Pressing and releasing the selected channel button *again* will deselect it.

Multi-Channel Select (Summing): Press and *hold down* a desired channel button, then press other channel buttons to add (sum) additional channels (or press any again to deselect). Release *all* buttons to accept the selection set. When multiple channels are selected, pressing and *holding* an already selected channel button will allow further modification to the selection set. Releasing *all* buttons accepts the new selection set. Pressing and immediately *releasing* an already selected channel button will select only it and deselect all other channel selections.

If the user presses a previously selected (lighted) channel button, but then decides not to make any changes to the selection set, the user should keep the button *depressed* for at least **1.5 seconds** before releasing it. This will preserve the current selection set as though the button was never pushed.

7 Bargraph Brightness Trim Pot

This control is recessed into the front panel and can be accessed using a small screwdriver. Turning it clockwise will increase the relative brightness of the bargraph display LED segments. Adjusting this one control will simultaneously affect the brightness of all bargraph displays on the front panel.

(Continued)

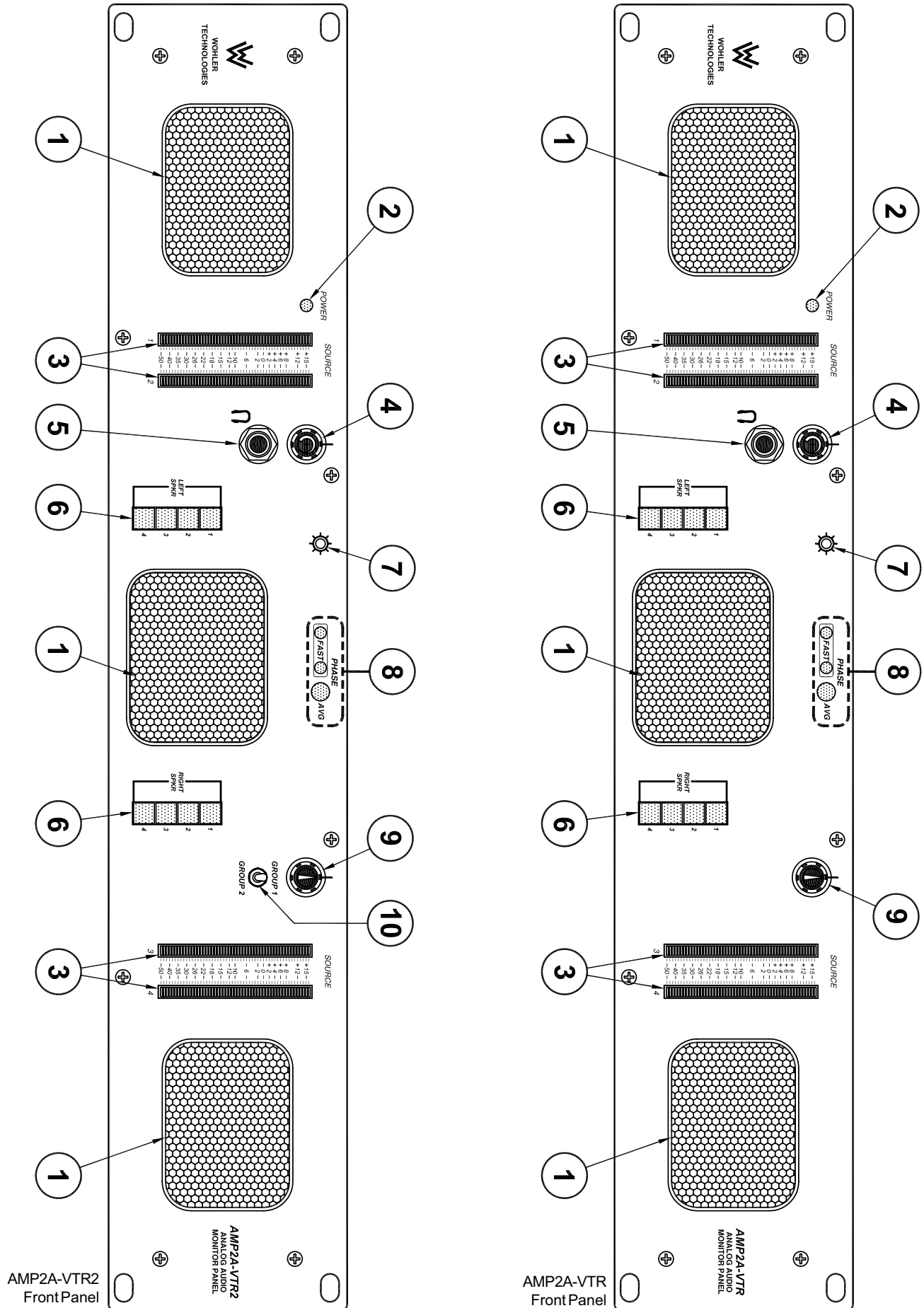


Figure-2a: Front Panel Features

(Continued)

8 Phase Indication LEDs

These three LEDs indicate the instantaneous and average phase (polarity) conditions in the signal pair (of assigned channels) monitored in the left and right speaker channels. The two smaller LEDs labeled **FAST** show *instantaneous* phase relationships in the signal. The larger LED labeled **AVG** will indicate the *average* phase condition. Indication is as follows:

- The *left* **FAST** LED glows (or blinks) GREEN for *in-phase* signals.
- The *right* **FAST** LED glows (or blinks) AMBER for *out-of-phase* signals.
- The large **AVG** LED indicates the *average* phase condition by glowing GREEN for *in-phase* signals, or RED for *out-of-phase* signals.

In general, it is sufficient to regard the **AVG** LED as adequate for proper phase monitoring. While it is normal for stereo signals to contain some intermittent *out-of-phase* and *in-phase* conditions (**FAST** LEDs), a steady RED glow of the **AVG** LED almost always indicates an *out-of-phase* alarm condition.

9 Balance Control Pot

This control pans the volume balance between the left and right speakers.

10 Group Select Switch (AMP2A-VTR2)

On the AMP2A-VTR2 model, this switch selects between the two groups (**GROUP 1** or **GROUP 2**) of four channels as input on the rear panel. It is from the *selected* group of four channels that the **Speaker Assign Channel Buttons** (Item 6, page 8) are used to independently assign channels to the right and left speakers.

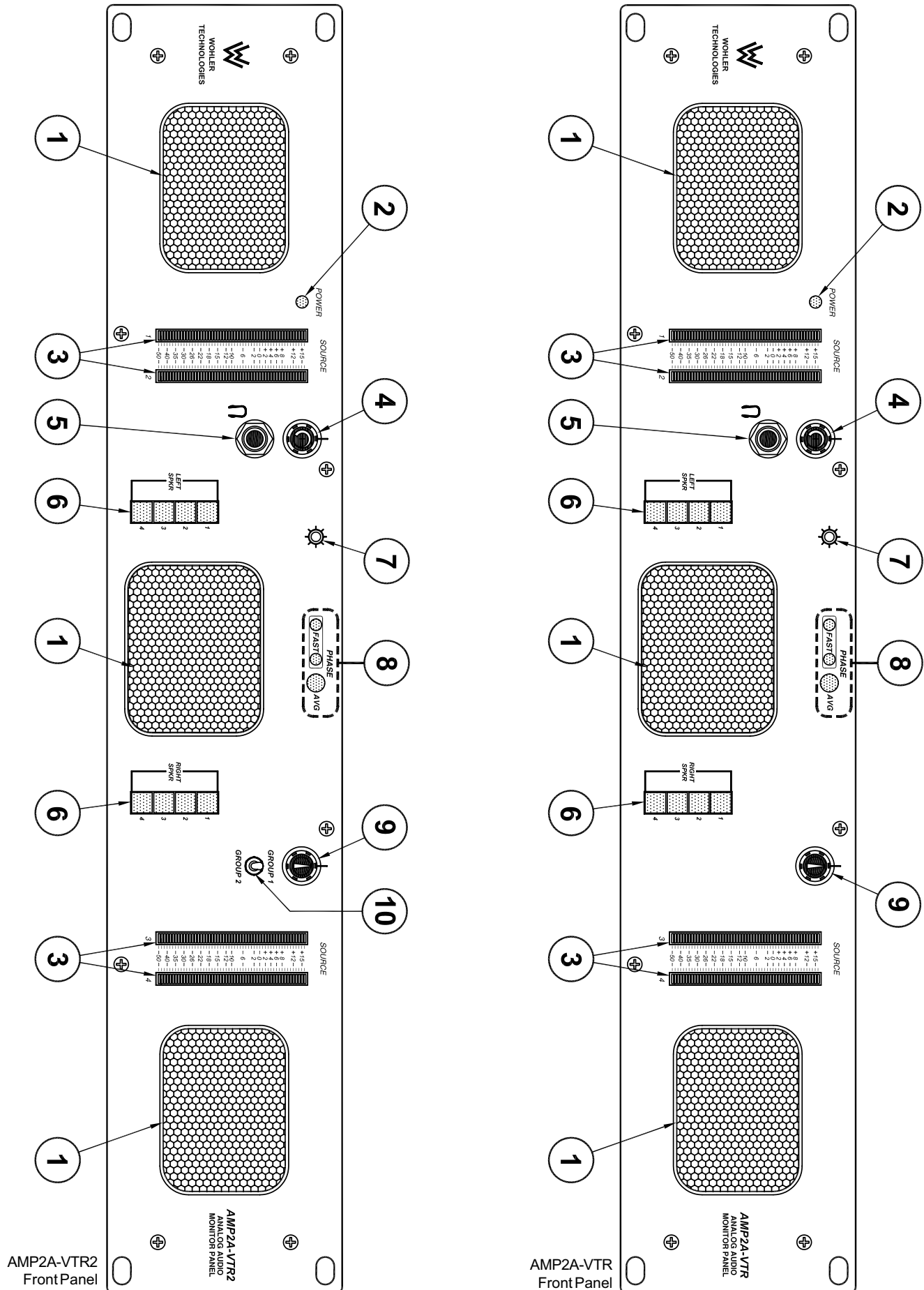


Figure-2a: Front Panel Features

Rear Panel Features

Please refer to **Figure-2b** on the following page to familiarize yourself with the rear panel features of the AMP2A-VTR and AMP2A-VTR2 units. The following sections describe these features and are referenced, by letter, to **Figure-2b**.

A Power Connector

Attach a standard IEC-320 power cord between this connector and mains power (100 - 250VAC, 50/60 Hz). The front panel **Power LED** (**Item 2**, page 8) will glow GREEN to indicate operating voltages are present.

B Analog Input Connectors (AMP2A-VTR)

These 3-pin male Phoenix connectors (**INPUTS, 1-4**) accept standard analog audio signals and are configured for balanced 90K Ω connections. Channel input numbers are silk-screened above the connectors (**1, 2, 3, 4**) and correspond to the numbers available for selection by the left and right **Speaker Assign Channel Buttons** on the front panel (**Item 6**, page 8).

Connector pinout information is silk-screened just above each input connector.

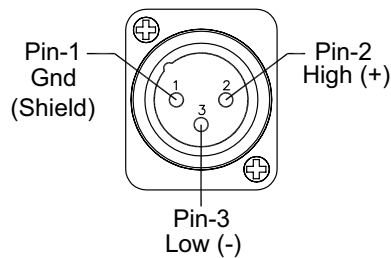
C Analog Input Connectors (AMP2A-VTR2)

These 3-pin male Phoenix connectors (**INPUTS, CHANNEL 1-4, GROUP 1-2**) accept standard analog audio signals and are configured for balanced 90K Ω connections. The two banks (groups) of input connectors are interleaved and either group of four inputs (**GROUP 1** or **GROUP 2**) may be selected for monitoring using the 2-position **Group Select Switch** on the front panel (**Item 10**, page 10). Channel input numbers are silk-screened above the connectors (**CHANNEL 1, 2, 3, 4**) and correspond to the numbers available for selection by the left and right **Speaker Assign Channel Buttons** on the front panel (**Item 6**, page 8).

Connector pinout information is silk-screened just above each connector.

D Selected Output Connectors

These two 3-pin male XLR connectors are analog outputs of the **Analog Input Connectors** (**Item B** or **C**) as selected by the left and right **Speaker Assign Channel Buttons** (**Item 6**, page 8) and **Group Select Switch** (**Item 10**, page 10) on the front panel. The left connector outputs the left channel (**CHAN. A (L)**) and the right connector outputs the right channel (**CHAN. A (R)**). Both connectors are configured for low impedance connections and the output signals are not affected by the volume/balance controls or headphone mute. For XLR connector pinout information see the diagram below.



Male XLR Pinout

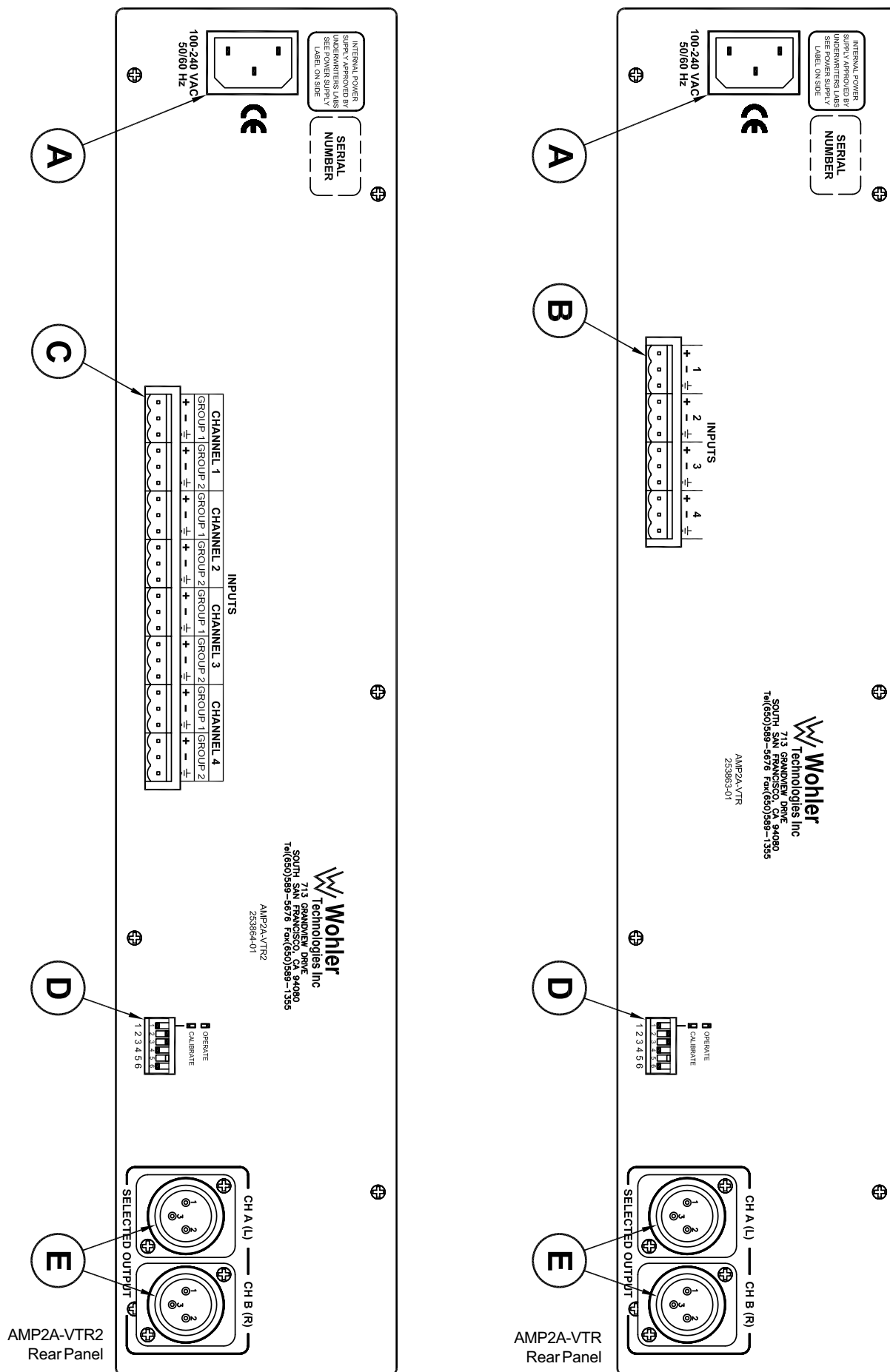


Figure-2b: Rear Panel Features

Audio Amplifier and Speaker Configuration

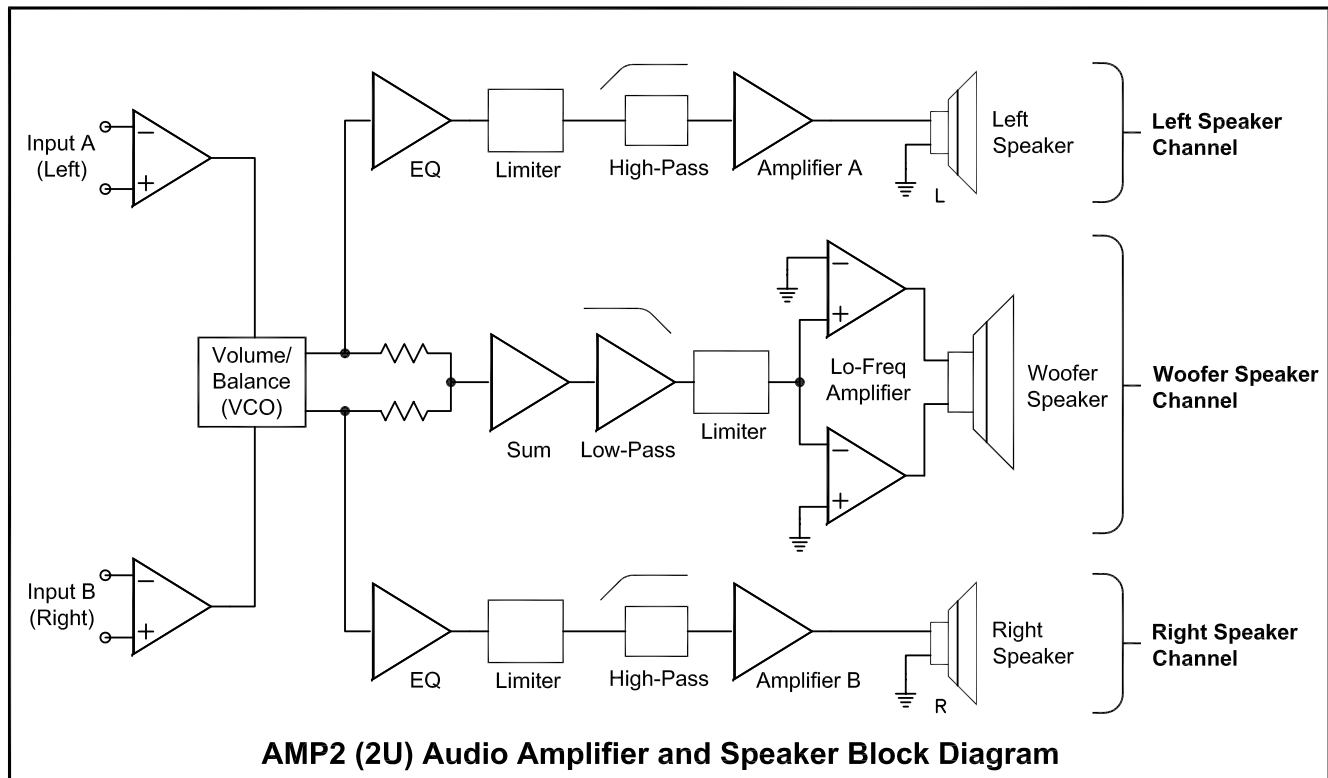
General Description

All models in the **AMP Series** contain high performance transducers (speakers) driven by three power amplifiers; two amplifier/driver combinations handle midrange and high frequency information in the left and right (stereo) speaker channels, while the third amplifier channel sums the left and right channel information *below* the 500 Hz crossover point in the woofer (bass) speaker(s). Note that the woofer channel is NOT a dedicated **LFE** (subwoofer) or **Center** channel.

Speaker Configuration

All **AMP2** (2U) products are configured with two speaker channels (left and right) to reproduce midrange and high-range audio frequencies (in stereo) and one woofer speaker channel to reproduce the summed (combined) *low-range* audio frequencies from the left and right speaker input channels.

See below for a simplified diagram of the **AMP2** audio amplifier/speaker configuration.



Balance Control Characteristics

The balance control attenuates the signal from the source, so that the left and right bass frequencies (summed together and reproduced in the woofer channel) will also respond to the balance control.

Example:

If an audio signal of a voice speaking English is fed to the "A" (left) input and a voice speaking Spanish is fed to the "B" (right) input, then the left speaker channel will reproduce the midrange and high-range frequencies of the English speaking voice, the right speaker channel will reproduce the midrange and high-range frequencies of the Spanish speaking voice, and the woofer speaker channel will reproduce the summed (combined) low-range frequencies of *both* voices.

If the balance control is *panned to the left*, then the Spanish speaking voice in the right speaker channel will diminish in volume, the Spanish speaking voice in the woofer speaker channel will also diminish, and the English speaking voice in both the right speaker channel and woofer speaker channel will increase slightly (to maintain overall output level). The converse is true if the balance control is panned to the right.

See the **AMP2 (2U) Audio Amplifier and Speaker Block Diagram** above for placement of the balance control in the audio amplifier circuit.

Section 3

Technical Information

General Technical Observations

Level Meter Rear Panel 6-Position DIP Switch Settings

Level Meter Internal 10-Position DIP Switch Settings

Level Meter DIP Switch Locations

Level Meter Alternative Scales

Level Meter Phase Correlation Feature

AMP2A-VTR Interconnect Block Diagram

AMP2A-VTR2 Interconnect Block Diagram

General Technical Observations

General Mechanical Observations

Elimination of cabinet and component sympathetic vibrations (resonances) requires considerable attention to mechanical details. Because of this, and the physical constraints of the speaker's acoustic enclosures, even minor changes to any of the mechanical details of the unit can seriously impair its acoustic performance. This especially applies to the speaker baffles. If mechanical work on the unit is necessary, be sure to make adequate notes to permit accurate reassembly.

Unfortunately, the unusual and wholly proprietary method of magnetic shielding is usually degraded slightly by any disassembly of the unit, except removal of the rear panel. Almost any maintenance or repair will require removal of the cover. If an immediately adjacent video monitor shows magnetic interference after reassembly of the unit, it must be returned to the factory to restore the shielding completely.

General Audio Circuitry Observations

Since a single-sided power supply is used, all amplifier sections are "biased" with a 1/2 supply reference, so all opamp signal terminals on the main board should have a DC level of +12V, +/-0.7V. Signal inputs to the main audio board from any of the input select circuits are via the balanced input stage, in lieu of the XLR analog inputs on the basic unit. Signal feed points for level meters and the phase indicator are immediately after the input stage, and before the volume control section.

The signal pick-off for the headphones is after the volume and balance controls. Speaker muting is controlled by circuitry that senses connection of headphones to the jack.

The power amps are attached to an aluminum heatsink plate (which is also connected to the circuit common for these devices). The heatsink plate forms an operational module separate from the chassis, which allows access to the solder side of the circuit board while power is applied to the circuitry. To avoid thermal shutdown of the power amp(s), they should NOT be operated without their tabs being fastened to the heatsink plate.

Variations in the frequency response of different production runs of drivers has sometimes required minor adjustments in the equalization/crossover components in individual runs of units. Some of these components may have values slightly different than those indicated in the schematic, which are the nominal ones. If any of the drivers (speakers) are replaced, it may be helpful to change some of these components to achieve maximum flatness of response.

The operating threshold of the woofer limiter is critical to both satisfactory reproduction of musical transients and preventing damage to, or destruction of, the speaker itself. The side speaker output limiter circuits are similarly important, though not as critically adjusted.

The woofer power amps are arranged in a bridge configuration; care must be taken to avoid letting EITHER speaker terminal contact the chassis (common) OR THE GROUNDED LEAD OF ANY TEST EQUIPMENT so as not to short out the power amps. The side speaker outputs are single-ended, so these precautions are not necessary for them.

Level Meter Rear Panel 6-Position DIP Switch Settings

Line Level (Auto) Calibration, Reference Level, and Display Mode

This DIP switch sets the **Line Level Calibration**, **Reference Level**, and **PPM/VU Display Mode**. See the descriptions and diagram below for setting information.

Line Level (Auto) Calibration:

The unit is calibrated at the factory. To recalibrate:

- 1) Turn on the power.
- 2) Apply the desired reference level (nominal 0) signal to all channels.
- 3) Make sure the **Reference Level** DIP sections (2 and 3) are set to the nearest level of the input signal being applied for calibration (i.e., 0, +4, +6 or +8). The user should make sure that the signal applied to all four channels is within +/- 4 dB of the reference level selected by DIP switch sections 2 and 3.
- 4) Place DIP section 1 in the **DOWN** position.
- 5) Wait 10 seconds. The unit will remove the previous calibration and the *new* calibration will be applied.
- 6) Place DIP section 1 in the **UP** position and return unit to service.
- 7) Only ONE auto-calibration attempt may be made for each cycling of AC power to the unit. Once the **Line Level Calibration** DIP switch has been placed in the **CAL** position, it is necessary to cycle the power before that DIP switch will be functional again, EVEN if a calibration attempt was unsuccessful.

If one wishes to calibrate again, turn off the power to the unit and repeat steps 1 through 6.










Reference Level:

DIP switch sections 2 and 3 determine the **Reference Level**, which adjusts the level of the input signal and the resultant level displayed on the LED bargraphs. Factory setting is +4 dB. See DIP switch diagram below for settings.

Bargraph Display Mode:

DIP switch sections 4 and 5 determine how peak levels are displayed for the associated meters on the front panel. There are four possible settings; **VU Only**, **VU-PPM Floating Segment**, **PPM Only**, and **PPM-PPM Floating Segment**.

The **VU Only** selection has a VU floating segment when a **Peak Hold** value is selected using the **Internal 10-Position DIP Switch Module** (see page 18). The factory default setting is **VU-PPM Floating Segment**. See diagram below for settings.

AMP Series Level Meter Rear Panel DIP Switch Settings		
Meter Calibration	Reference Level	Display Mode
<div>1 x</div>  Calibrate <div>1 2 3 4 5 6</div>	<div>2 3 x</div>  +8 dB  +6 dB  +4 dB  0 dB <div>1 2 3 4 5 6</div>	<div>4 5 x</div>  VU Only  VU-PPM Floating Segment  PPM Only  PPM-PPM Floating Segment <div>1 2 3 4 5 6</div>

Note: Position-6 of DIP switch is NOT used.

See **Level Meter Internal 10-Position DIP Switch Settings** on page 18 for how to set the **Peak Hold** and **PPM Ballistics** characteristics.

Meter Calibration NOTE:

For more accurate indication of signal levels, meters are tuned to effect a “rounding” function, which occurs BETWEEN the thresholds of any two bargraph segments. This means the level meter zero LED segment will turn on at one-half the smallest spacing between LED segments (mid-scale resolution) *before* that segment's scale indication. Below are the offset amounts.

53-Segment Meters: The “rounding offset” is **0.5 dB** for the **Analog (extended VU)**, **Digital**, **Nordic**, and **DIN** scales. It is **0.25 dB** for the **BBC** scale and **0.125 dB** for the **VU** scale.

Example: Using the **Analog (extended VU)** scale, a meter calibrated for a **+4 dBu** nominal level will actually turn the zero LED segment of the level meter on at **+3.5 dBu** (and so *all* segments will turn on at **0.5 dBu before** each segments associated silk-screened scale indication).

Level Meter Internal 10-Position DIP Switch Settings

This 10-position DIP switch is accessed by removing the top cover of the **AMP** unit and is located on the **919174 PCB** (the same PCB on which the 6-position *rear panel* DIP switch is located). See page 19 for a diagram of the **919174 PCB** and the DIP switch location.

AMP Series 26- and 53-Segment Level Meter Internal 10-Position DIP Switch Settings														
Scale Selection					Peak Hold (Bargraph Display)					PPM Ballistics (Bargraph Display)				
<div><div><div>x</div><div>2</div><div>3</div><div>4</div><div>x</div></div><div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div><div><div>1</div><div>2</div><div>3</div><div>4</div><div>5</div><div>6</div><div>7</div><div>8</div><div>9</div><div>10</div></div></div></div>		Do Not Use	<div><div><div>x</div><div>2</div><div>3</div><div>4</div><div>x</div></div><div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div><div><div>1</div><div>2</div><div>3</div><div>4</div><div>5</div><div>6</div><div>7</div><div>8</div><div>9</div><div>10</div></div></div></div>		NORDIC Scale	<div><div><div>x</div><div>5</div><div>6</div><div>x</div></div><div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div><div><div>1</div><div>2</div><div>3</div><div>4</div><div>5</div><div>6</div><div>7</div><div>8</div><div>9</div><div>10</div></div></div></div>		Peak Hold - Manual (See Note 2)	<div><div><div>x</div><div>7</div><div>8</div><div>x</div></div><div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div><div><div>1</div><div>2</div><div>3</div><div>4</div><div>5</div><div>6</div><div>7</div><div>8</div><div>9</div><div>10</div></div></div></div>		IEC268-10, Type 1			
<div><div><div>x</div><div>2</div><div>3</div><div>4</div><div>x</div></div><div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div><div><div>1</div><div>2</div><div>3</div><div>4</div><div>5</div><div>6</div><div>7</div><div>8</div><div>9</div><div>10</div></div></div></div>		Extended VU Scale (Standard Analog)	<div><div><div>x</div><div>2</div><div>3</div><div>4</div><div>x</div></div><div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div><div><div>1</div><div>2</div><div>3</div><div>4</div><div>5</div><div>6</div><div>7</div><div>8</div><div>9</div><div>10</div></div></div></div>		DIN Scale	<div><div><div>x</div><div>5</div><div>6</div><div>x</div></div><div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div><div><div>1</div><div>2</div><div>3</div><div>4</div><div>5</div><div>6</div><div>7</div><div>8</div><div>9</div><div>10</div></div></div></div>		Peak Hold - 3 Second	<div><div><div>x</div><div>7</div><div>8</div><div>x</div></div><div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div><div><div>1</div><div>2</div><div>3</div><div>4</div><div>5</div><div>6</div><div>7</div><div>8</div><div>9</div><div>10</div></div></div></div>		IEC268-10, Type 2			
<div><div><div>x</div><div>2</div><div>3</div><div>4</div><div>x</div></div><div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div><div><div>1</div><div>2</div><div>3</div><div>4</div><div>5</div><div>6</div><div>7</div><div>8</div><div>9</div><div>10</div></div></div></div>		VU Scale	<div><div><div>x</div><div>2</div><div>3</div><div>4</div><div>x</div></div><div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div><div><div>1</div><div>2</div><div>3</div><div>4</div><div>5</div><div>6</div><div>7</div><div>8</div><div>9</div><div>10</div></div></div></div>		Do Not Use	<div><div><div>x</div><div>5</div><div>6</div><div>x</div></div><div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div><div><div>1</div><div>2</div><div>3</div><div>4</div><div>5</div><div>6</div><div>7</div><div>8</div><div>9</div><div>10</div></div></div></div>		Peak Hold - 10 Second	<div><div><div>x</div><div>7</div><div>8</div><div>x</div></div><div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div><div><div>1</div><div>2</div><div>3</div><div>4</div><div>5</div><div>6</div><div>7</div><div>8</div><div>9</div><div>10</div></div></div></div>		DIN 45406			
<div><div><div>x</div><div>2</div><div>3</div><div>4</div><div>x</div></div><div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div><div><div>1</div><div>2</div><div>3</div><div>4</div><div>5</div><div>6</div><div>7</div><div>8</div><div>9</div><div>10</div></div></div></div>		BBC Scale	<div><div><div>x</div><div>2</div><div>3</div><div>4</div><div>x</div></div><div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div><div><div>1</div><div>2</div><div>3</div><div>4</div><div>5</div><div>6</div><div>7</div><div>8</div><div>9</div><div>10</div></div></div></div>		Custom Scale (See Note 3)	<div><div><div>x</div><div>5</div><div>6</div><div>x</div></div><div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div><div><div>1</div><div>2</div><div>3</div><div>4</div><div>5</div><div>6</div><div>7</div><div>8</div><div>9</div><div>10</div></div></div></div>		Peak Hold - Off	<div><div><div>x</div><div>7</div><div>8</div><div>x</div></div><div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div><div><div>1</div><div>2</div><div>3</div><div>4</div><div>5</div><div>6</div><div>7</div><div>8</div><div>9</div><div>10</div></div></div></div>		Single Sample Rise Time (SSRT)			
Phase Correlation Display (53-Segment Meters Only)														
<div><div><div>x</div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div>9</div><div>x</div></div><div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div><div><div>1</div><div>2</div><div>3</div><div>4</div><div>5</div><div>6</div><div>7</div><div>8</div><div>9</div><div>10</div></div></div></div> <div>PC Off</div>					<div><div><div>x</div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div>9</div><div>x</div></div><div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div><div><div>1</div><div>2</div><div>3</div><div>4</div><div>5</div><div>6</div><div>7</div><div>8</div><div>9</div><div>10</div></div></div></div> <div>PC On</div>									

NOTES:

- Switch positions **1** and **10** are NOT used and should be left at the factory set position.
- The **Peak Hold - Manual** setting allows the bargraph display meters to indefinitely maintain the peak hold value until it is reset by the operator, either by pressing a reset button (a special option specified at time of order) or by removing power and then reapplying power to the unit (unplug/replug power cord). Contact Wohler Technologies for more information about this feature.
- Contact Wohler Technologies for information about custom scales.

PPM Characteristics (Ballistics):

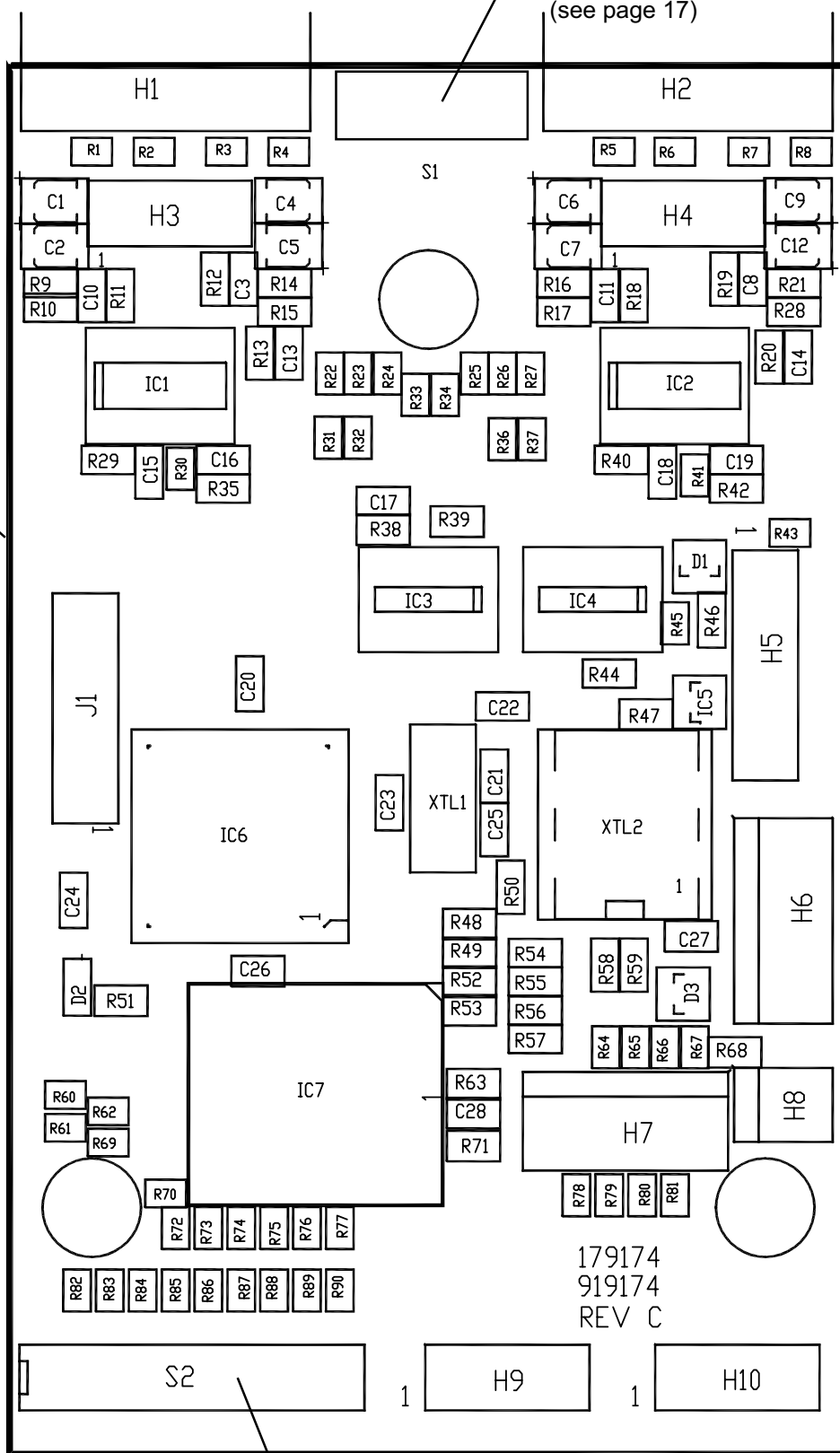
The **PPM** characteristics determine the **Integration Time** (rise time) and **Return Time** (fall time) of the level meter. The **Integration Time** is the time it takes for the lighted segments of the level meter, after application of a 5 KHz tone at a certain reference level, to *rise* within a specified number of dB of that level. **Return Time** is the time it takes for the lighted segments of the level meter to *fall* a certain number of dB after removal of a 5 KHz tone of a certain reference level. The **PPM** characteristics available for selection using DIP switch sections **7** and **8** of the 10-position **Internal DIP Switch** (as shown in the above diagram) are as follows:

IEC268-10, Type 1:	Integration (Rise) Time is 5 ms (-2 dB), Return (Fall) Time is 1.7 seconds (20 dB)
IEC268-10, Type 2:	Integration (Rise) Time is 10 ms (-2 dB), Return (Fall) Time is 2.8 seconds (24 dB)
DIN 4506:	Integration (Rise) Time is 5 ms (-2 dB), Return (Fall) Time is 1.5 seconds (20 dB)
Single Sample:	Integration (Rise) Time is a single sample, Return (Fall) Time is 1.5 seconds (20 dB)

Level Meter DIP Switch Locations

Rear Panel Level Meter 6-Position
DIP Switch Module
(see page 17)

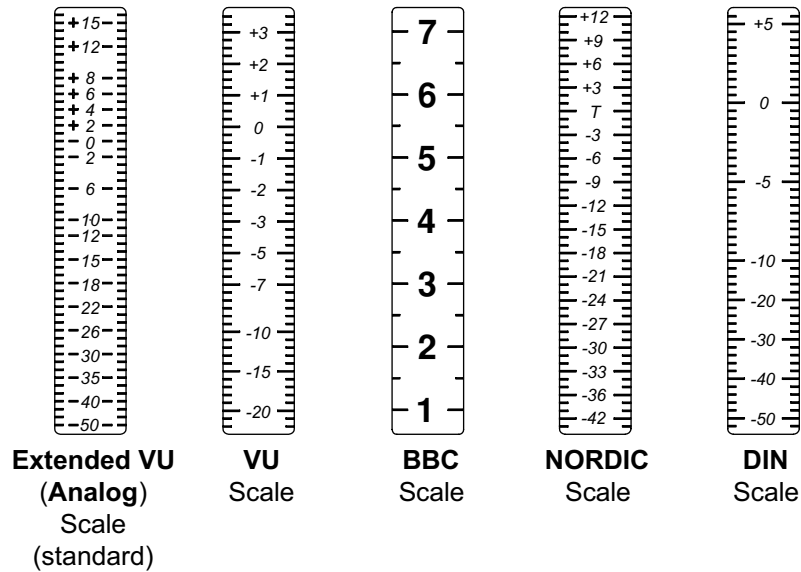
919174 PCB



Internal Level Meter 10-Position
DIP Switch Module (see page 18)

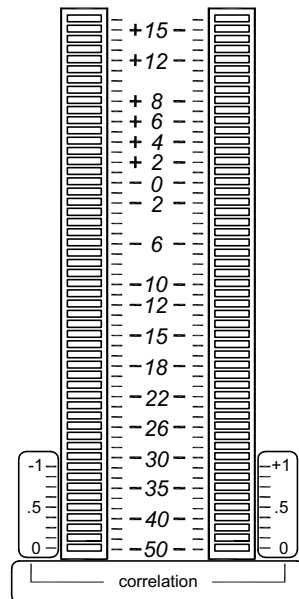
Level Meter Alternative Scales

The standard scale used on the AMP2A-VTR and AMP2A-VTR2 level meters (53-segment) is the **Extended VU** scale (see diagram below). However, if alternative scale characteristics are selected for the level meters using the **Level Meter Internal 10-Position DIP Switch** (page 23), it is recommended that a label with the appropriate scale be applied to the front panel LED bargraph level meters. See the diagram below for scale comparison. Scale selection includes the **Extended VU** (standard Analog), **VU**, **BBC**, **NORDIC**, **DIN**, and **Custom** (not shown) scales. Contact **Wohler Technologies** for information about alternative scale labels.



Level Meter Phase Correlation Feature

Since it is sometimes helpful to observe phase relationships between two signals being monitored, a **Phase Correlation** feature can be implemented within the lower section of an existing bargraph pair in the 53-segment LED bargraph level meters used in the AMP2 units. This feature may be turned ON and OFF by setting the **Level Meter Internal 10-Position DIP Switch** module (page 18). Below is an illustration of the level meter bargraphs with the **Phase Correlation** label applied.

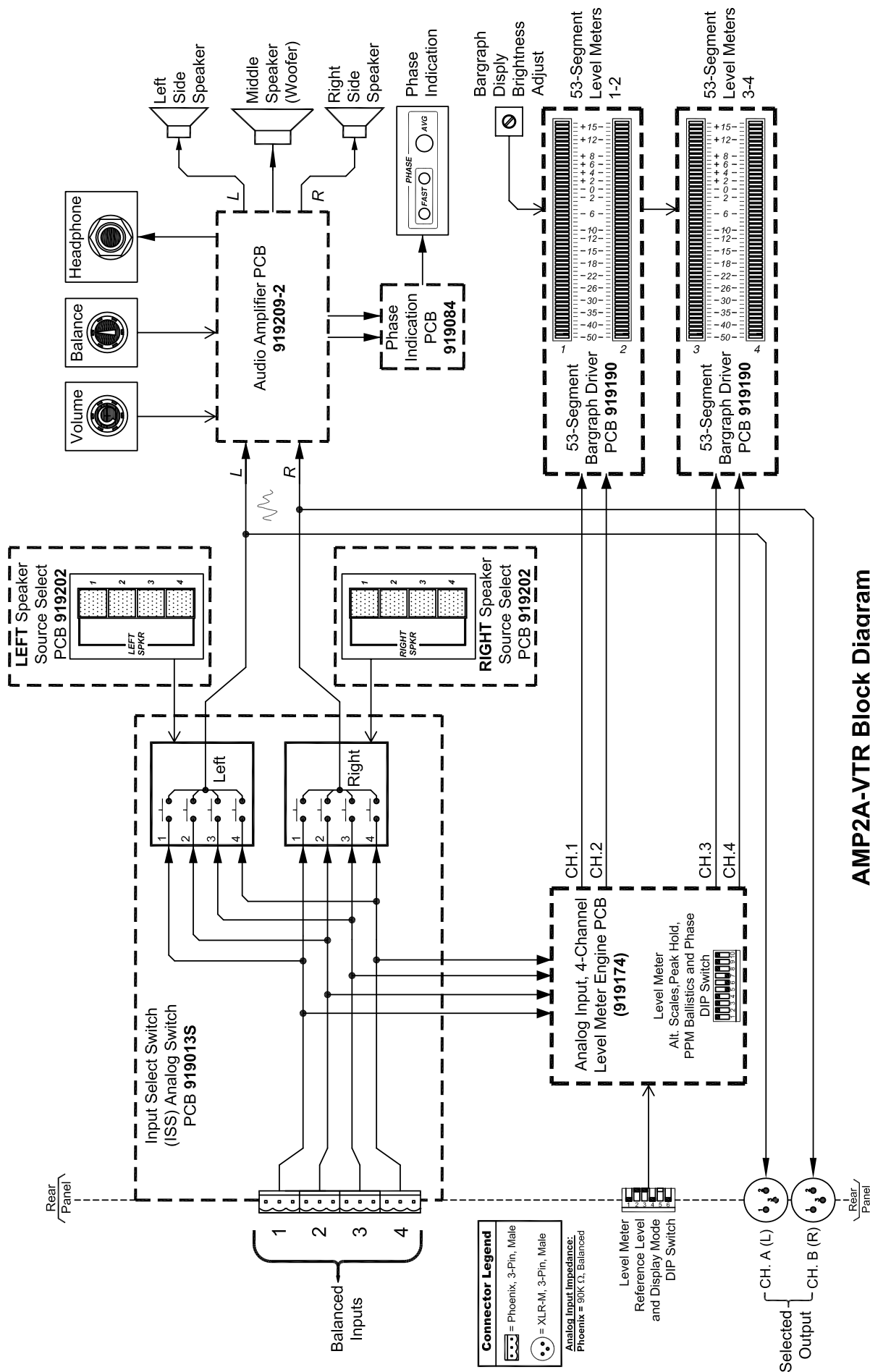


When the audio level in BOTH channels is high enough, the **Phase Correlation** display occupies the lower few segments of both bargraphs of a stereo pair. Behavior of the **Phase Correlation** indication is as follows:

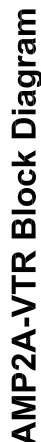
- Positive** correlation = ascending **AMBER** bar in the *right* bargraph
- Negative** correlation = ascending **RED** bar in the *left* bargraph

The bottom nine (9) segments are used by the 53-segment LED bargraph display for **Phase Correlation** indication. One additional segment above the active correlation region is always OFF, to serve as a marker. The **Phase Correlation** display is visible ONLY so long as the VU audio level is above this blank segment (*tenth* from the bottom).

AMP2A-VTR Interconnect Block Diagram



AMP2A-VTR Block Diagram



NOTES:

NOTE:

PCB layout and schematic support documentation is available upon request.



Wohler Technologies, Inc.

31055 Huntwood Avenue

Hayward, CA 94544

Phone: (510) 870-0810 Fax: (510) 870-0811

US Toll-Free: 1-888-596-4537

www.wohler.com **support@wohler.com**